

The Relation between Education Effect and Individual Characteristics of WBT Teaching Materials

Hiroo HIROSE¹, Yoshito YAMAMOTO², Hiroshi ICHIKAWA³

¹Faculty of Management of Administration and Information, ²Faculty of Education, ³Faculty of Home Economics,

¹Tokyo University of Science, Suwa, ²Tokyo University of Science, ³Otsu Women's University, Japan,

¹5000-1, Toyohira, Chino, Nagano 391-0292, Japan, ²1-3, Kagurazaka, Shinjuku, Tokyo 162-8601, Japan, ³12 Sanbancyo, Chiyoda-ku, Tokyo, 102-8357, Japan

¹hirose@rs.tus.ac.jp; ²yama@rs.kagu.tus.ac.jp; ³ichikawa.h@otsuma.ac.jp

Abstract

When personal computer (PC) user used WBT (Web Based Training) as supplementary teaching materials of the exercises, this research clarified the difference of the person who did not use the person who positively used the WBT teaching materials and the WBT teaching materials so much by the experiments compared with some individual characteristics concerning the PC operation. We chose the feelings of operating PC uncomfortably, state/action orientation, the risk orientation, and technostress syndrome to the PC operation as examined individual characteristics. It is clarified that these individual characteristics are related to the PC operation by a past research. We did the experiment that made HTML and the WBT teaching materials concerning C language supplementary teaching materials of the class. We verified the utility of the WBT teaching materials from the result of the frequency using the WBT teaching materials and the Pre/Post examination. Next, I clarified the relation between WBT teaching materials use frequency and individual characteristics by multiple regression analysis. As a result, I have understood feelings of operating the PC uncomfortably explain the WBT teaching materials use frequency by coefficient of determination rate 11-16%. In a word, the chance to study even if the WBT teaching materials is applied for people who are uncomfortable with PC operation is small and the education effect is relatively small few.

Keyword

Web Based Training; E-Learning; Student Characteristics; Study Method; Evaluation of Instruction

Introduction

The Internet spreads widely, and we have used it for me to educate by a lot of scenes. There are the following advantages in e-Learning that is various the

functions requested from e-Learning by the educational area side on the other hand, and uses PC (Kenji ITO 2002).

- The learner understands according to the greediness for learning and the understanding level.
- The learning effect rises to the learner by the multimedia.
- It is easy for the learner to undertake the teacher's support.
- The learner comes for me to be able to take communications with the remote place.
- The educator becomes possible the education based on the history and the review of the investment.

Thus, e-Learning that uses the PC that centers on WBT is expected to be going to spread more and more by a variety of educational sites in the future. Moreover, a lot of learning systems to make good use of the WBT technology are developed, and it begins to be used widely. When WBT is used as a textbook, and WBT is used as supplementary teaching materials of the class, the scene that uses WBT is various. It is reported that the education effect goes up respectively (for example, Yamamoto 2003).

We have taken charge of the exercise and the lecture related to the computer relation and the programming at the junior college and the university since 1989. We learnt the thing where the student who did not like Electronic media existed like the student who did not want to keep seeing the display for a long time from

these experiences. Will e-Learning be media of an appropriate education against such a student? Moreover, does the education effect go up compared with the student who doesn't have the sense of incompatibility in Electronic media? The student where I use e-Learning and the education effect goes up exists. Oppositely, the student where the education effect doesn't go up even if e-Learning is used exists. It is important to apply e-Learning in consideration of these individual characteristics.

In this research, I aim to clarify the difference of an individual characteristics of the subjects that doesn't use the subjects that positively uses the WBT teaching materials and the WBT teaching materials so much when I apply WBT as a supplementary teaching materials. When I use the WBT teaching materials as a result by the class, I can understand the student who doesn't use the WBT teaching materials beforehand. I can expect that the education effect goes up to more students by presenting teaching materials other than the WBT teaching materials to such a student. Moreover, it is possible to become the basic data for me to make the WBT teaching materials that I can know individual characteristics of the subjects that doesn't want to use the WBT teaching materials, and even such a student use.

Individual Characteristics Selected by This Research

We compare the following individual characteristics with the use frequency of the WBT teaching materials. And, I clarify individual characteristics that don't want to use the WBT teaching materials. It is reported that these individual characteristics influence the PC operation by a past research. (For example, Hiroo Hirose and Kazuaki Namba 2004, Manabu YAMAJI and Kazuaki Namba and Yasuaki Kohashi 2000)

Feelings of Operation the PC Uncomfortably

When becoming a chance to have for people to operate the PC or to operate, people occasionally have disgust for the PC. Moreover, people come to want to run away from the PC by fear and the disgust of the failure by the failure experience of the past occasionally. We call such consideration as feelings of operating PC uncomfortably. We can distinguish whether to have this sense with the questionnaire form (Hiroo Hirose and Kazuaki Namba 2004).

Action/State Orientation

The action orientation is to try to keep attention to the structure of the act. The state orientation is to try to

keep attention my continuing in the acknowledgment in the past and present futures. These are classified into action orientation/neutral type/state orientation by ACS-90 questionnaire form (Kuhl,J and Beckmann 1993), and consists of the following three subscales:

- Action orientation subsequent failure vs. preoccupation
- Prospective and decision-related action orientation vs. hesitation
- Action orientation during (successful) performance of activities (intrinsic orientation) vs. volatility

Risk Orientation

The risk orientation is a degree how much the possibility of the risk (= variable) is requested, and the risk is requested oppositely and the avoiding safety is requested. We call the decision making that values the possibility and the person who behaves a risk seeking type. We call the decision making that values safety and the person who behaves a risk averting type. We can distinguish these by the questionnaire form "Lopes's lot" (Lopes L, L 1987).

Technostress Ssyndrome

The technostress syndrome is divided into the techno-centered and techno-anxious by the pathology phenomenon of the mind and body with whom the person engaged in the computer work is common. At present when the PC spread widely, the symptom is seen even by the person not engaged in the computer work. It is possible to judge by the questionnaire form that consists of 26 questions (Nobuyo KASUGA 1997). There is a possibility that the WBT teaching materials is not used by the stress to PC by the technostress syndrome. Therefore, the technostress syndrome took it to this research though it was not individual characteristics.

Outline of WBT Teaching Materials Used to this Experiment

We used the WBT teaching materials concerning C language of Figure 1 and WBT teaching materials concerning HTML of Figure 2 for the experiment. The student can freely access the WBT teaching materials from not only school but also outside the school. The student of the subjects buys mobile PC by all members when entering a school and has utilized the class and the private life.

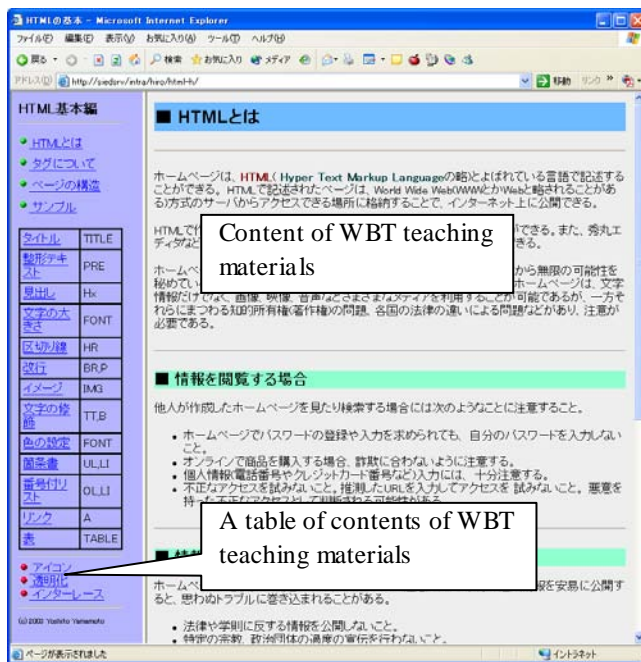


FIGURE 1 WBT TEACHING MATERIALS CONCERNING HTML

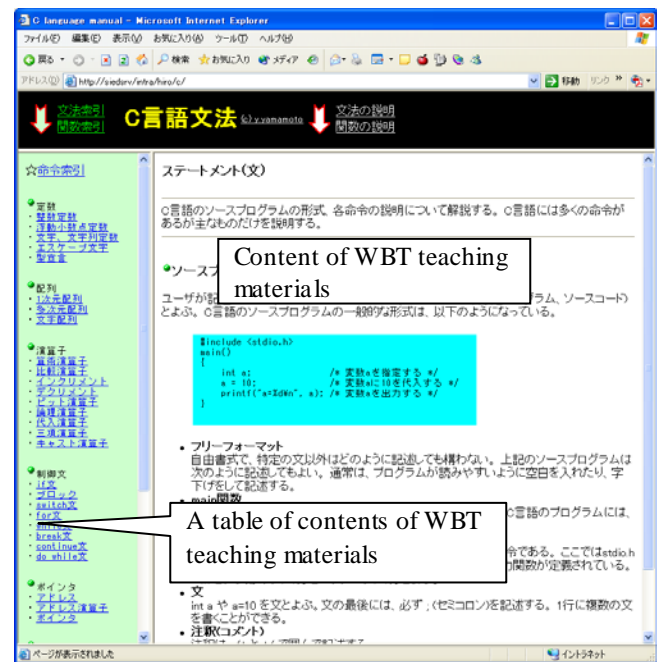


FIGURE 2. WBT TEACHING MATERIALS CONCERNING C LANGUAGE

WBT teaching materials are composed of the frame, a table of contents of the WBT teaching materials is displayed in a left frame, and the content of the WBT teaching materials is displayed with a right frame. I used CSS(Cascading Style Sheet) only by HTML so that we might make the WBT teaching materials because there was a limit in the plastic operation on sentences. In addition, I made the WBT teaching materials so that the logical structure and the display format were consistent as legibly as possible. We made the WBT teaching materials supplementary teaching materials for self-study by the person who studied HTML or C language for the first time and made the WBT teaching materials available. Therefore, I published a lot of exercises and applied cases for me to explain the introductory part of HTML and C language. When a usual class ended for associating contents and the class progress of the WBT teaching materials, we explained. Therefore, I review with these teaching materials, and the student of the subjects understands the place that was not able to be understood during the lesson.

Experiment that Applies WBT Teaching Materials as Supplementary Teaching Materials

Purpose of Experiment

When the teacher offers the WBT teaching materials as supplementary teaching materials, we analyze the

difference of an individual characteristic of the person who doesn't use it with the person who positively uses the WBT teaching materials.

Method of Experiment

1) Subjects

The subjects that uses the WBT teaching materials concerning HTML is a freshman who learns "Exercises in computer network literacy". The subjects that uses the WBT teaching materials concerning C language is a sophomore who learns "Programming and Exercises".

2) Procedure

We collected the questionnaire form concerning the individual characteristics described in Chapter 2 to all subjects. When teaching it in the 1st, we examined the investigation of HTML and the advance knowledge of C language. We explained the usage of the WBT teaching materials in the subjects as a supplementary teaching material. We explained the use frequency of the WBT teaching materials was not evaluated to the result in the subjects. We examined the confirmation of the acquired knowledge by the sixth teaching it. We calculated the recurrence accomplishment value (Hiroo YAMAMOTO and Minoru NAKAYAMA and Yasutaka SHIMIZU 1997) of two tests. The use frequency of the WBT teaching materials was totaled with the Web server.

Results of Experiment

We were able to collect the data of 58 people with the WBT teaching materials of HTML. Similarly, we were able to collect the data of 35 people with the WBT teaching materials of C language.

1) Investigation Result of Individual Characteristics

Figure 3 shows the ratio of people who are uncomfortably with PC operation. Figure 4 shows the ratio of people who are risk seeking. The class of HTML and C language was compared as a result of T test, and there was no significant difference in any individual characteristics.

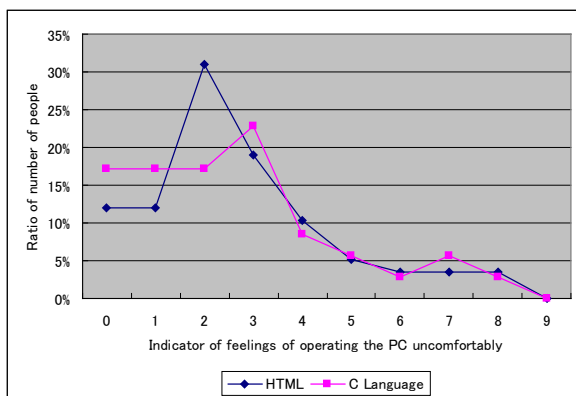


FIG. 3 THE RATIO OF FEELINGS OF OPERATING PC UNCOMFORTABLY

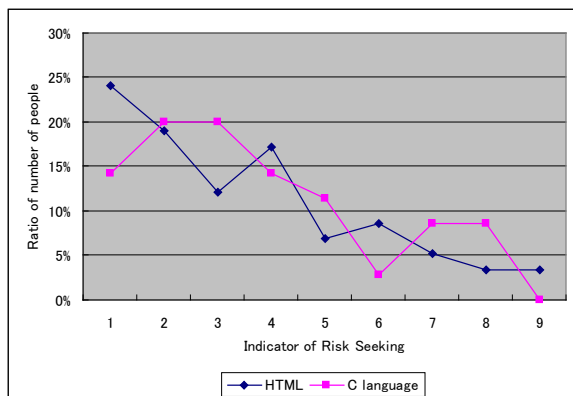


FIG. 4 THE RATIO OF RISK SEEKING

2) Use Frequency of WBT Teaching Materials

The WBT use frequency according to the class is as shown in Table 1 and Figure 5. The use frequency of the WBT teaching materials is a frequency in which HTML files other than a table of contents of the WBT teaching materials are displayed. The class of HTML and C language was compared as a result of T authorization, and there was no significant difference in the profit use frequency of the WBT teaching material.

3) Use Frequency of WBT Teaching Materials

Either class of HTML and C language also divided into a group with a lot of WBT use frequencies and few groups. We calculated the recurrence accomplishment value of each group. Table 2 is a result of the HTML class. Table 3 is a result of the C language class. As a result of T test, the class of HTML was significant (significance level 1%). The education effects improve to the subjects that use a lot of WBT teaching materials more than the deflection score. The class of C language understands the same thing from $T=5.3\%$.

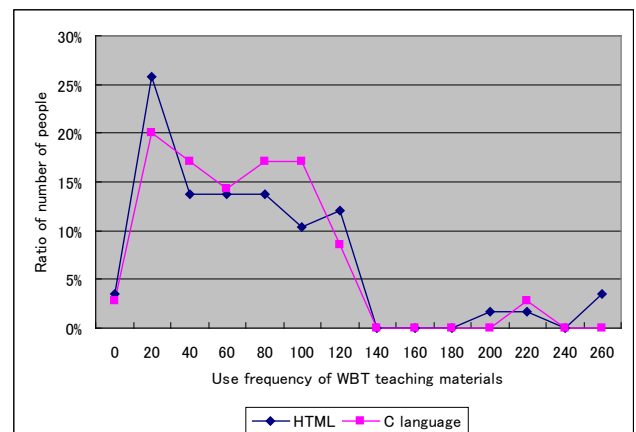


FIG. 5 USE FREQUENCY OF WBT TEACHING MATERIALS ACCORDING TO CLASS

TABLE 1 USE FREQUENCY OF WBT TEACHING MATERIAL ACCORDING TO CLASS

	HTML	C language
Average use frequency	61.7	58.2
Standard deviation	57.0	41.4

4) Individual Characteristics in Which it Explains Use Frequency of WBT Teaching Material

As for the subjects that use a lot of WBT teaching materials in the previous paragraph, it has been understood that the education effect is relatively large. Next, we analyze the difference of an individual characteristic of subjects that use a lot of WBT teaching materials and subjects not used. We assumed the WBT teaching materials use frequency to be a dependent variable, assumed the individual characteristics treated by this experiment to be an independent variable, and calculated a multi regression analysis. Table 4 and Table 5 show the result.

TABLE 2 WBT TEACHING MATERIAL USE FREQUENCY OF HTML

		a few of reference	A lot of reference
	Number of subjects	29	29
Pre Test	Mean value	19.59	26.07
	Standard deviation	11.13	15.29
Post Test	Mean value	66.74	88.81
	Standard deviation	25.28	13.87
recurrence accomplishment value	Mean value	-8.80	8.80
	Standard deviation	22.91	14.75
	T test	0.0005	
	Deflection score	-17.59	

TABLE 3 WBT TEACHING MATERIAL USE FREQUENCY OF C LANGUAGE

		a few of reference	A lot of reference
	Number of subjects	17	18
Pre Test	Mean value	9.37	12.14
	Standard deviation	7.98	7.71
Post Test	Mean value	51.47	66.94
	Standard deviation	23.17	22.44
recurrence accomplishment value	Mean value	-5.76	5.44
	Standard deviation	20.30	19.64
	T test	0.053371	
	Deflection score	-11.20	

From Table 4, uncomfortably feelings of operating the PC explains the WBT teaching materials use frequency by the coefficient of determination by 10.6% for the class of HTML. In addition, when an individual characteristic of Action/State orientation (Action orientation subsequent failure vs. preoccupation) is added, coefficients of determination explain the use frequency of the WBT teaching materials by 16.5%. People who are not uncomfortable with PC operation and pays attention to the cause of the failure because of the partial regression coefficient has understood a lot of WBT teaching materials are used. Oppositely, people who are uncomfortable with PC operation and doesn't pay attention to the cause of the failure has understood the thing that the WBT teaching materials is not so used. When we apply the WBT teaching materials to the person who has this tendency, we are predictable when the education effect is small.

From Table 5, uncomfortably feelings of operating the PC explains the WBT teaching materials use frequency by the coefficient of determination by 15.5% for the class of C language. From the partial regression coefficient, people who are not uncomfortable with PC operation have understood a lot of WBT teaching materials are used. This tendency was similar to the HTML class.

Conclusion

By this research, people who are uncomfortable with PC operation have understood coefficients of determination by 11-16% do not use the WBT teaching material. In addition, People who are not uncomfortable with PC operation and pays attention to the cause of the failure because of the partial regression coefficient has understood a lot of WBT teaching materials are used. There is a possibility that the education effect is low even if the WBT teaching materials is applied to people who are uncomfortable with PC operation. It is necessary to prepare another supplementary teaching material other than the WBT teaching materials for people who are uncomfortable with PC operation.

Not only the university but also the WBT teaching materials is widely widespread to the society. It is necessary to verify this result by the subjects of a wider age though this research experimented on the student as subjects.

TABLE 4 RESULT OF MULTI REGRESSION ANALYSIS IN HTML CLASS

Dependent variable	Residual sum of squares	Multi correlation coefficient	Coefficient of determination (R^2)	R^2
WBT teaching materials use frequency	348474.758	0.406	0.165	0.134
	R^{*2}	Residual degrees of freedom	Residual standard deviation	
	0.105	55	79.598	
Independent variable	Residual sum of square	Amount of change	Variance ratio	Partial regression coefficient
Constant term	575215.605	226740.847	35.7867	177.217
Indicator of feelings of operating the PC uncomfortably	397680.323	49205.565	7.7661	-14.936
Indicator of Action/State orientation (failure)	373102.268	24627.509	3.8870	-10.037
Indicator of Action/State orientation (decision-related)	340565.304	-7909.454	1.2541	+
Indicator of Action/State orientation (action)	344936.539	-3538.219	0.5539	+
Indicator of Risk seeking	345613.272	-2861.487	0.4471	+
Indicator of techno-centered	339475.489	-8999.270	1.4315	+
Indicator of techno-anxious	346609.736	-1865.023	0.2906	+

TABLE 5 RESULT OF MULTI REGRESSION ANALYSIS IN C LANGUAGE CLASS

Dependent variable	Residual sum of square	Multi correlation coefficient	Coefficient of determination (R^2)	R^2
WBT teaching materials use frequency	49358.591	0.393	0.155	0.129
	R^{*2}	Residual degrees of freedom	Residual standard deviation	
	0.105	33	38.674	
Independent variable	Residual sum of square	Amount of change	Variance ratio	partial regression coefficient
Constant term	133396.249	84037.658	56.1856	78.225
Indicator of feelings of operating the PC uncomfortably	58396.171	9037.581	6.0423	-7.607
Indicator of Action/State orientation (failure)	48477.653	-880.937	0.5815	-
Indicator of Action/State orientation (decision-related)	48028.405	-1330.186	0.8863	-
Indicator of Action/State orientation (action)	48878.995	-479.596	0.3140	+
Indicator of Risk seeking	49135.923	-222.668	0.1450	-
Indicator of techno-centered	48989.918	-368.673	0.2408	+
Indicator of techno-anxious	47894.768	-1463.823	0.9780	+

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